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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,863	03/10/2004	Wen-Chau Liu	370.7978USQ	3733

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EXAMINER

DICKEY, THOMAS L

ART UNIT

PAPER NUMBER

2826

DATE MAILED: 02/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/797,863	Applicant(s) LIU ET AL.	
	Examiner Thomas L. Dickey	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8 and 10-17 is/are rejected.
- 7) ☒ Claim(s) 5-7 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Oath/Declaration

1. The oath/declaration filed on 01/02/98 is acceptable.

Drawings

2. The formal drawings filed on 01/02/1998 are acceptable.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

4. If applicant is aware of any relevant prior art, he/she requested to cite it on form **PTO-1449** in accordance with the guidelines set forth in M.P.E.P. 609.

In particular the Examiner would appreciate a discussion on Applicant's part of the distinction between the invention claimed in the instant application and the ones claimed in 09/321,535, 09/564,742, 09/729,883, and 10/157,251, in all of which at least two of the instant inventors participated as co-inventors.

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Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4,8,10-13, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by OHKUBO ET AL. (5,949,096).

Ohkubo et al. discloses a semiconductor diode (note that Ohkubo et al.'s diode is formed as the gate electrode of a MOSFET, said MOSFET being capable of amplifying a signal placed on the diode/ gate assembly) with hydrogen detection capability, with a semi-insulating GaAs semiconductor substrate 11; a doped $\text{Al}_x\text{Ga}_{1-x}\text{As}$ (thus selected from the group consisting of n-type InGaP and $\text{Al}_x\text{Ga}_{1-x}\text{As}$) with $x=0-1$ semiconductor active layer 14, with a dopant concentration of 2×10^{18} (ranging from 1×10^{15} to 5×10^{18} atoms/cm³), and a thickness ranging from 1000 to 5000 angstroms, formed on said substrate 11 and made from a compound having the formula XYZ, in which X is Ga, a Group III element, Y is Al, another Group III element different from X, and Z is As, a Group V element; an undoped GaAs semiconductor buffer layer 12 having a thickness of 5000 angstroms (ranging from 1000 to 50000 angstroms), sandwiched between said substrate 11 and said active layer 14; an n-GaAs semiconductor contact-enhancing layer 16 having a dopant concentration of 10^{18} (ranging from 1×10^{17} to 1×10^{19} atoms/cm³) and a thickness of 3000 angstroms (ranging from 100 to 3000 angstroms), formed on said ac-

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tive layer 14 and made from a compound having the formula MN, in which M is Ga, a Group III element, and N is As, a Group V element; an ohmic contact layer 19-20 formed on said semiconductor contact-enhancing layer 16 and extending through said semiconductor contact-enhancing layer 16 and into said active layer 14; and a Pt (thus selected from the group consisting of Pt, Pd, Ni, Rh, Ru, and Ir) Schottky barrier contact layer 18 formed on said active layer 14 so as to provide a Schottky barrier therebetween, said Schottky barrier contact layer 18 being made from platinum, a metal that is intrinsically capable of dissociating a hydrogen molecule into hydrogen atoms. Note figures 5A-5D and column 4 lines 28-62 of Ohkubo et al. Note that Svensson et al., 4,058,368 column 1 lines 23-27, Rauh 4,892,834 column 2 lines 3-5, and Liu et al. 6,160,278 column 1 lines 20-22, all support the Examiner's contention that it is an intrinsic property of platinum to be capable of dissociating a hydrogen molecule into hydrogen atoms.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over OHKUBO ET AL. (5,949,096) in view of LIU ET AL. (6,160,278).

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Ohkubo et al. discloses a device with all the limitations of claims 14 and 15, including the limitation that the ohmic contact layer is made from AuGe or AuGe/Ni, except that the AuGe or AuGe/Ni layer has a thickness ranging from 1000 angstroms (100 nm) to 50000 angstroms (5 microns). Note figures 5A-5D and column 4 lines 28-62 of Ohkubo et al. Ohkubo et al., for whatever reason, is utterly silent concerning how thick the contact layer should be.

However, Liu et al. discloses a semiconductor MOSFET with hydrogen detection capability having an AuGe/Ni ohmic contact layer with a thickness ranging from 1000 angstroms (100 nm) to 50000 angstroms (5 microns), specifically 3000-5000 angstroms. Note column 2 lines 63-64 of Liu et al. Therefore, it would have been obvious to a person having skill in the art to set the otherwise completely unspecified thickness of Ohkubo et al.'s AuGe/Ni ohmic contact layer to the 3000-5000 angstroms such as taught by Liu et al. for one very simple reason: To build the device described by Ohkubo et al. one would have to decide on one's own, without guidance from Ohkubo et al., just how thick to make the contact layer. In the face of this uncertainty one having skill in the art would at least have been assured that a 3000-5000 angstrom ohmic contact layer would work at least as well as the one Liu et al. built in their device.

B. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over OHKUBO ET AL. (5,949,096) in view of HOKE (5,060,030).

Ohkubo et al. discloses a device with all the limitations of claim 17 except that the Schottky barrier contact layer should have a thickness ranging from 100 to 20000 ang-

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stroms. Note figures 5A-5D and column 4 lines 28-62 of Ohkubo et al. Ohkubo et al. are again, unfortunately, utterly silent as to how thick the Schottky barrier contact layer should be.

However, Hoke teaches one having skill in the art that a "typical" Schottky barrier contact such as Hoke's contact 16 should have 1000 angstroms, at least of platinum. Note figure 1 and column 5 lines 44-48 of Hoke. Therefore, it would have been obvious to a person having skill in the art to set the otherwise completely unspecified thickness of Ohkubo et al.'s Schottky barrier contact layer to the 1000 angstroms such as taught by Hoke for one very simple reason: To build the device described by Ohkubo et al. one would have to decide on one's own, without guidance from Ohkubo et al., just how thick to make the contact layer. In the face of this uncertainty one having skill in the art would at least have been assured that a 1000 angstrom Schottky barrier contact layer would work at least as well as the one Hoke built in his device.

Allowable Subject Matter

7. Claims 5-7 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 571-272-1913.

The examiner can normally be reached on Monday-Thursday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**Thomas L. Dickey
Patent Examiner
Art Unit 2826
02/05**